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**Exposing the Nuclear Burning Ashes of Radius Expansion Type I X-Ray Bursts**

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Type I X-ray bursts are powered by thermonuclear burning of freshly accreted H and He on the surface of a neutron star in a low-mass X-ray binary. The ashes of this burning are ordinarily hidden from view, buried well below the overlying photosphere. We show, however, that some of the ashes become exposed during especially bright X-ray bursts, known as photospheric radius expansion bursts. During such bursts, a radiation-driven wind forms, which our calculations show ejects as much as 1% of the recently forged ashes of burning. The spectral signature of these ejected ashes should be detectable with current high-resolution X-ray telescopes. A detection would help constrain the nuclear burning processes and might enable a measurement of the gravitational redshift of the neutron star.